**Abstract for the OVWST Session in the NASA Oceanography Scientific Conference 3-5 April 2001**

# QuikSCAT Geophysical Model function for Precipitation and Extreme High Wind

**Simon H. Yueh, Bryan Stiles, Wu-Yang Tsai, Hua Hu, and W. Timothy Liu**

Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109

Phone: 818-354-3012; E-mail: simon.yueh@jpl.nasa.gov

The spaceborne scatterometer winds are critical to atmoshperic and oceanic process and modeling studies. The SeaWinds scatterometer on the QuikSCAT spacecraft has been operating since August 1999 to provide global mapping of ocean winds. The ocean surface winds from the QuikSCAT scatterometer has been shown to be accurate, except for precipitating and extreme high wind conditions. It is known that the QuikSCAT scatteroemter winds underestimate the strength of tropical cyclones and overestimate the wind speed for low to moderate wind speeds under rainy conditions. This places limitations on the applications of SeaWinds scatterometers for severe weather conditions.

To determine the feasibility of improving the QuikSCAT estimates under rainy and extreme high wind conditions, the data from QuikSCAT radar operating at 13.4 GHz (Ku-band) have been analyzed to examine the relationship of Ku-band $\sigma 0$ of ocean surface with rain and wind speed. For lower than 20 m/s wind speed, the QuikSCAT $\sigma 0$ data were correlated with the wind from the National Center for Environmental Predictions and the rain rates from the Special Sensor Microwave/Imager (SSM/I). For higher wind speeds, we examine the data from tropical cyclone passes in the Atlantic in 1999 and 2000. The wind speed of tropical cyclones was simulated by the Holland's tropical cyclone model with the parameters from the National Hurricane Center best track analysis at the QuikSCAT footprint locations.

It is shown that the QuikSCAT $\sigma 0$s increase with increasing rain rate for low and moderate wind speeds (<15 m/s) and has an opposite trend for hurricane force winds (>32 m/s). It is also shown that the QuikSCAT $\sigma 0$ modulation by the wind direction is reduced by rain. The results are consistent with the existing QuikSCAT wind speed biases at the presence of rain. Our results suggest that the rain rate can be introduced as an additional modeling parameter for the Ku-band scatterometer model function to reduce the wind retrieval errors resulting from the rain for severe weather conditions.